

## MULTIPLE CHIPS IMAGE SENSOR PACKAGE

### BACKGROUND OF THE INVENTION

#### Field of the invention

The invention relates to a multiple chips image sensor, and in particular to  
5 an image sensor module having improved quality and reduced the volume of the package.

#### DESCRIPTION OF THE RELATED ART

Referring to FIG. 1, a conventional image sensor module includes a lens holder 10, a lens barrel 20, and an image sensor 30. The lens holder 10 has an  
10 upper end face 12, a lower end face 14 and an opening 16 penetrating through the lens holder 10 from the upper end face 12 to the lower end face 14. An internal thread 18 is formed on an inner wall of the opening 16 of the lens holder 10. The lens barrel 20 formed with an external thread 22 is inserted from the upper end face 12 of the lens holder 10, received within the opening 16, and screwed to the  
15 internal thread 18 of the lens holder 10. The lens barrel 20 is formed with a transparent region 24 under which an aspheric lens 26 and an infrared filter 28 are arranged in sequence. The image sensor 30 has a first surface 32 and a second surface 34 opposite to the first surface 32 on which a transparent layer 36 is arranged. The image sensor 30 is bonded to the lower end face 14 of the lens  
20 holder 10 through the transparent layer 36. The screwed length between the lens barrel 20 and the lens holder 10 may be adjusted to control the distance from the aspheric lens 26 of the lens barrel 20 to the transparent layer 36 of the image

sensor 30.

The above-mentioned image sensor module has the following drawbacks.

1. Because the image sensor 30 is bonded to the lower end face 14 of the lens holder 10 through the transparent layer 36, the image sensor 30 cannot be replaced when the image sensor 30 of the module is damaged. In this case, the overall module has to be treated as waste material, and other good elements in the module may not be recycled.

2. Because the transparent layer 36 is bonded to the lower end face 14 of the lens holder 10 by the adhesive, which may contaminate the surface of the transparent layer 36, poor optical signals may be obtained.

3. When the module is assembled, the transparent layer 36 has to be precisely positioned with the aspheric lens 26 and then bonded to the lens barrel 20. Once the positional precision deviates from the standard level, the overall module cannot be reassembled and has to be treated as waste material

4. The lens holder 10 has to be additionally provided to combine the lens barrel 20 with the image sensor 30.

### **SUMMARY OF THE INVENTION**

An object of the present invention is to provide a multiple chips image sensor module having advanced test effort before assemble module.

Another object of the present invention is to provide a multiple chips image

sensor module having a reduced and miniaturized package volume.

To achieve the above-mentioned objects, the invention provides a first substrate, which have a upper surface and a lower surface, the upper surface is formed with a plurality of first connected ends, the lower surface is formed with a plurality of second connected ends. A photosensitive chip is arranged at the upper surface of the substrate, and is electrically connected the first connected ends by a plurality of wires. A lens holder is formed with penetrate hole at a central thereof, an internal thread is formed on the inner wall of the penetrate hole, the lens holder is mounted on the upper surface of the first substrate to encapsulate the photosensitive chip. A lens barrel is arranged within the penetrate hole of the lens holder and is formed with an external thread, which is screwed to the internal thread of the lens holder, the lens barrel is formed with a chamber and an opening communicating the chamber. An aspheric and transparent layer are placed within the chamber. A second substrate is formed with a first surface on which a plurality of signal output ends are formed, and a second surface on which a plurality of signal input end are formed. The first surface of the second substrate mounted on the lower surface of the first surface, then the signal output end are electrically connected the second ends of the first surface. And a chip located on the second surface of the second substrate and is electrically connected to the signal input ends of the second substrate.

### **BRIEF DESCRIPTION OF THE DRAWINGS**

FIG. 1 is a cross-sectional view showing a conventional image sensor

module.

FIG. 2 is an exploded cross-sectional view showing multiple chips image sensor module of the present invention.

FIG. 3 is a cross-sectional view showing multiple chips image sensor  
5 module of the present invention.

### DETAILED DESCRIPTION OF THE INVENTION

Referring to FIGS. 2 and FIG3, a multiple chips image sensor module of the present invention includes a first substrate 40, a photosensitive chip 42, a lens holder 44, a a lens barrel46, a second substrate48 and a chip50.

10 The first substrate40 has an upper surface52 and a lower surface54, the upper surface52 is formed with a plurality of first connected ends56, the lower surface54 is formed with a plurality of second connected ends58.

The photosensitive chip42 is arranged at the upper surface52 of the substrate40, and is electrically connected the first connected ends56 of the  
15 substrate40 by a plurality of wires60.

The lens holder46 is formed with penetrate hole62 at a central thereof, an internal thread64 is formed on the inner wall of the penetrate hole62, the lens holder46 is mounted on the upper surface52 of the first substrate40 to encapsulate the photosensitive chip42.

20 The lens barrel46 is arranged within the penetrate hole62 of the lens

holder<sup>46</sup> and is formed with an external thread<sup>66</sup>, which is screwed to the internal thread<sup>64</sup> of the lens holder<sup>64</sup>, the lens barrel<sup>46</sup> is formed with a chamber<sup>68</sup> and an opening<sup>70</sup> communicating the chamber<sup>68</sup>. An aspheric<sup>72</sup> and transparent layer<sup>74</sup> are placed within the chamber<sup>68</sup>.

5           The second substrate<sup>48</sup> is a flexible/hard combination board, which includes a flexible board<sup>78</sup> and a hard board<sup>76</sup>, which includes is form a first surface<sup>80</sup> on which a plurality of signal output ends<sup>84</sup> are formed, and a second surface<sup>82</sup> on which a plurality of signal input ends<sup>86</sup> are formed. The first surface<sup>80</sup> of the second substrate<sup>48</sup> is mounted on the lower surface<sup>54</sup> of the first surface<sup>40</sup>, then  
10   the signal output ends<sup>84</sup> are electrically connected the second ends<sup>58</sup> of the first surface<sup>40</sup>. And

          The chip<sup>50</sup> is a signal processor, which is located on the flexible board 78 of the second substrate<sup>48</sup> and is electrically connected to the signal input ends<sup>86</sup> of the second substrate<sup>48</sup> by wires<sup>88</sup>.

15           The multiple chips image sensor module of the present invention has the following advantages.

          1. Since multiple chips image sensor module of the present may test and package the chip and module in the different time, then assemble the chip and module, so that it may enhance the quality.

20           2. Since the lens holder is directly arranged at the first substrate<sup>40</sup>, so prevent invent has a reduced and miniaturized package volume.

While the invention has been described by way of an example and in terms of a preferred embodiment, it is to be understood that the invention is not limited to the disclosed embodiment. To the contrary, it is intended to cover various  
5 modifications. Therefore, the scope of the appended claims should be accorded the broadest interpretation so as to encompass all such modifications.